MACHINE SERVICE BULLETIN NO. 415

SUBJECT: LA-5 and LA-6 Models
Carriage Shift

DATE: May 8, 1942

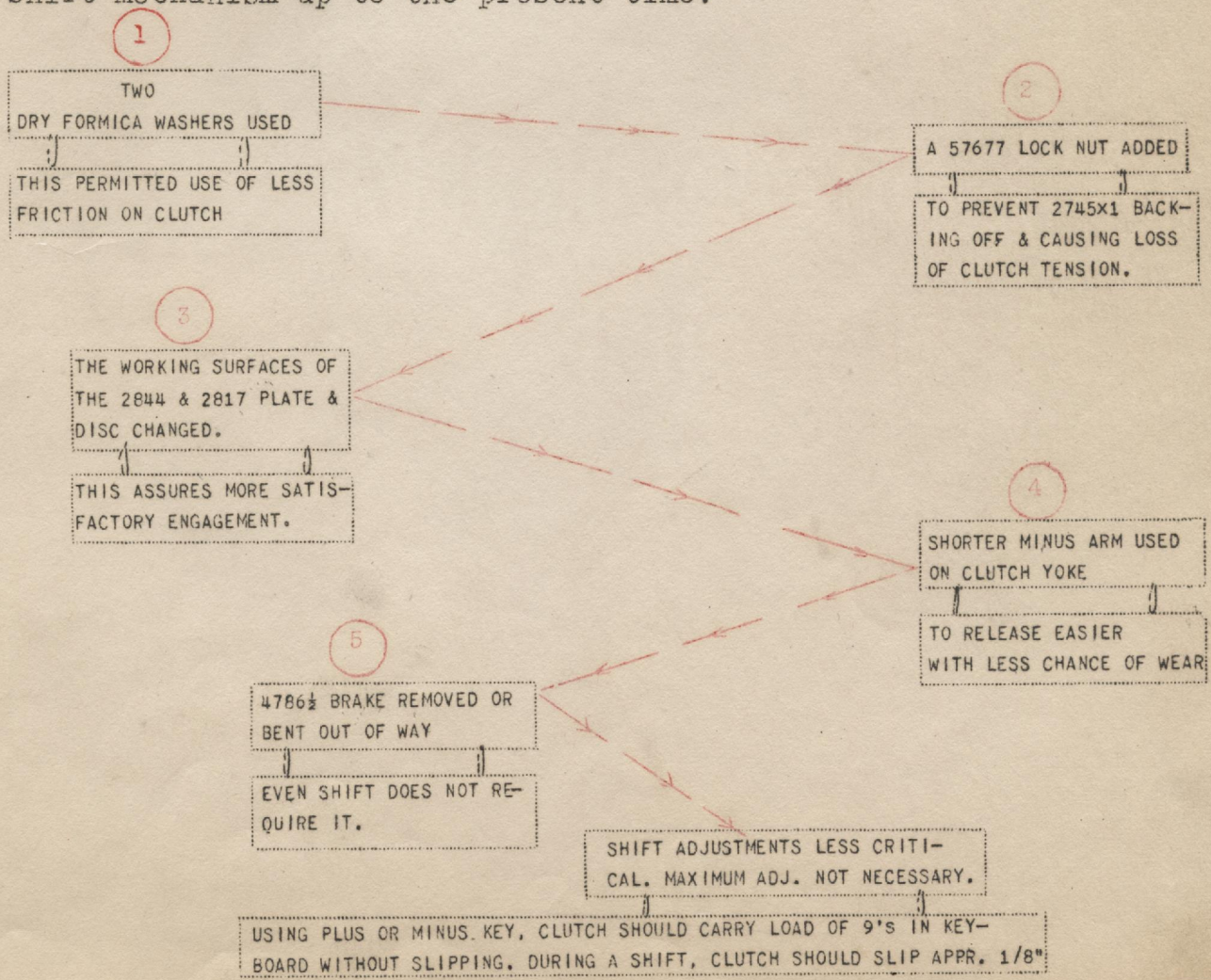
TO ALL MANAGERS:

We are releasing herewith a six page bulletin including a large drawing illustrating the shift mechanism of LA-5 and LA-6 models. The 20 insets of the illustration show the important shift adjustments and red directional lines indicate their approximate location in the machine. Both letters and part numbers are used to identify the sections of the mechanism.

For ready reference this drawing could be used to best advantage by affixing to a 22" x 25½" cardboard and attaching to wall in your Service Department.

Descriptive matter covers, first, the Sequence of Carriage Shift Mechanical Movements; secondly, Possible Causes of Improper Shift; and third, Corrective Steps for Carriage Shift.

All recent revisions in LA-5 and LA-6 shift mechanism design such as the jack shaft and clutch yoke are illustrated and described herein. The chart below explains the sequence of changes to the shift mechanism up to the present time.



SEQUENCE OF CARRIAGE SHIFT MECHANICAL MOVEMENTS

With the motor cord connected, the movement of the division lever 40-742 (R) from neutral position (T) into operating position will result in: -

1. The clutch yoke 40-781x1 (E) being moved into minus position and the 4733 division lever click (EE) moving downward. This downward movement of the 4733 permits the 4717 1/8 (FF) to latch under the 4717¼ (AA) when the 40-731 (S) moves toward the front of the machine on a minus bumper stroke. (See insets #6 & #7).

2. Switch points close from action of stud (BB) and motor starts. (Insets #12 & #13).

3. Part of the transmission revolves and gear (K) causes the machine jack shaft 27-715½ or 41-715½ to turn.

4. The cycling of the right-hand gear train causes the main carry shaft to revolve.

5. At the left-hand end of the main carry shaft is the 41-732 to which the connecting link (V) is fastened, and when the shaft revolves, the connecting link and rock lever 40-770½ (V) rock forward and rearward.

6. As the machine cycles in the minus direction, the dial pin (N) strikes the trip lever (P) extensions on the 40-777 or 41-777 on 9's or zero's and trips the machine. This permits the latch (VV) on the cycle stop arm 40-772 (DD) to pivot downward in the path of the rock lever and the rock lever drives the cycle stop arm toward the bumper pad (Z). (See insets #2, #4, and #5).

7. The movement of the cycle stop arm to the bumper pad causes the 40-731 shift lever (S) to move in the same direction, (being that it rests on a stud of the cycle stop arm). This movement of the shift lever causes it to slide under roller (X) on a minus stroke and engage and push the roller on a plus stroke. (See insets #10 and #11).

8. The lower extension (M) of the clutch yoke is still engaging the lug (L) on the transmission, but as the cycle stop arm moves to the bumper pad, the bevelled walls of the aperture in the cycle stop arm (inset #14) contact the clutch yoke neutralizing stud (CC) and thereby restores the clutch yoke to neutral.

9. While the 40-731 (S) is pushing the roller (X) on 4717¼, the latched 4717¼ coupling arm (AA) pushes the 4717 1/8 shift arm.

10. This movement causes the 4717x1 to move downward, and in doing so, link 4790 (KK) moves the 40-718 (LL).

11. This movement of the 40-718 causes the roller (PP) on it to move upward and push against the 40-707 shift cam (SS).

12. Being that the 40-705 slide (YY) is inward, the 40-707 shift cam (SS) will engage the 4738 ratchet (RR) on the shifter and cause the carriage to shift.

POSSIBLE CAUSES OF IMPROPER SHIFT AND CORRECTIVE STEPS

1. A bind in the carriage hinge rod (ZZ). Inset #9.

   Remove bind by readjusting hinge rod brackets (A6), but make sure carriage is properly set to the machine. Apply oil to rod. If rod is bent or rusted replace with new.

2. A bind in shifter (TT).

   Determine straightness of shifter. Straighten if necessary. Readjust shifter strap if rod binds in strap or between strap and keyboard. Lubricate. Remove brake spring (A5).

3. Motor weak, or machine speed below 380 R.P.M.

   See that machine is free from binds and that motor is properly lubricated. If machine speed is too low adjust speed screw or inspect governor. If motor itself is weak repair or replace.

4. Mechanism may be in need of lubrication.

   Apply oil to proper locations of moving parts. Where necessary, apply grease. Use Monroe oil, porpoise oil and Monroe grease.

5. Switch points not properly adjusted.

   Adjust the 41-714 (JJ) to stud (BB). Align contact points. Set points proper distance apart (Appr. 1/32") and prevent vibration in former style switch with adjustment of reinforcing strip 907¼.

6. The pin (N) on the 25-24 dial gear not engaging the trip lever (P) correctly might cause machine to run continuously and fail to shift at the proper time. Inset #2.

   Set trip lever so that points are slightly below top of gear tooth and adjust forward and rearward so that the point of the trip lever aligns with the center of the tooth.

7. Neutralizing stud (CC) bottoming in aperature in cycle stop arm. Inset #14.

   Adjust cycle stop arm lower extension downward for clearance. See Inset #14. NOTE: Clearance (HH) is important also.

8. Improper friction applied on jack shaft gear (D).

   Increase slip clutch friction if carriage shifts sluggishly, decrease if shift movement is excessive. Do not apply unnecessary friction.

9. Fibre washers not functioning properly on jack shaft. Use of oil and grease on them would cause excessive slippage. At other times, the clutch might fail to slip when it should.

   Use formica washers 2826a and 47117a, and leave dry. Do not apply oil or grease to them at any time. Use parts shown in Inset #1.

10. Backing off of the 2745x1 nut on the jack shaft.

    Install a 57677 lock nut on the jack shaft behind the 2745x1 nut.

11. Friction faces on 2817 plate and 2844x2 disc not providing full surface engagement.

    The engaging surfaces of this plate and disc have been altered to assure full face contact. Use 2844x2a D&P and 2826a.

12. Failure of clutch yoke extension (M) to hold on to lug (L) of 27-726 transmission gear (J), thereby preventing cycle stop arm from reaching bumper for a shift. See inset #17.

    Adjust (M) to (L) with a $\frac{1}{2}$ to 3/4 hold. Also adjust cycle stop arm to clutch yoke stud (CC) so that .005" clearance exists between top of aperture and the stud when the cycle stop arm and clutch yoke are in neutral. Also check sidewise adjustment of (M) to (L). See inset #17.

13. Adjustable tip (Q) not being properly adjusted to stud (A) to move the clutch yoke into proper relation with the transmission. This may cause the machine to run continuously. If the flat of stud (A), inset #19, is riveted out of position it may fail to properly actuate (Q). The flat should be at a right angle to center line (B). See insets #18 and #19.

    Adjust (Q) by loosening the two screws which hold it and locating its top in relation to stud (A) so that with division lever in operating position the stud will engage and move (Q) either forward or rearward according to the direction of the machine is traveling in. See inset #18.

14. The offset (Y) failing to latch under the hook of (AA) prior to a plus cycle.

    Removal of stock from the 40-731 (S) at (MM), inset #11, will permit a more satisfactory adjustment of the shift mechanism. See MSB #257. When division lever is thrown (Y) should not drop under (AA). On first minus bumper stroke, however, (S) with stock removed will allow (AA) to move toward rear of machine and (Y) will latch under it.

15. After the offset of (Y) latches under the hook of (AA) excessive clearance between the top of the offset and the bottom of the hook would retard the shift.

    Take up excess play between (Y) and hook of (AA) by turning eccentric (GG) and tightening its screw.

16. The forward end of the 4717-1/8 (FF) not being adjusted to (EE) to permit (Y) to move inward far enough toward (AA).

    Adjust the 4717-1/8 (FF) where it rests on (EE) so that (Y) will definitely latch under the hook when the machine is dividing.

17. Link (KK) being stretched (distorted.)

Carry a few of these in stock and use care when removing it, the 4717x1 or 40-718 from the machine. If link is stretched or worn it will have definite effect on adjustments.

18. Screw (NN) being adjusted too low.

Adjust roller (PP) to bottom with eccentric (QQ) and to left and leave in that position then adjust screw (NN) so that approximately 1/32" exists between ratchet collars (RR) and (SS). Inset #8.

19. Roller (PP) being adjusted too high.

Same as item 18.

20. Slide (YY) failing to move inward (binding).

See that slide (YY) works freely under the keyboard and that the 40-707 (SS) is not binding on the shifter rod. Also determine that the 4180 spring on the shifter rod is of correct strength.

21. Roller (X) being adjusted too high.

This roller should be adjusted so that the bottom point of the engaging face of the 40-731 strikes the roller approximately in the center when cycle stop arm is at bumper. See Inset #11. If the roller is adjusted low it will sometimes interfere with the stud on the machine stopping lever.

22. Failure to remove stock at (MM).

If stock is not removed here the adjustment of the 4717-1/8 may retard the shift adjustments. See MSB #257.

23. Excessive clearance between rock lever (UU) and end of latch (VV) on cycle stop arm. Inset #4.

Although not often encountered, this would indicate that offset (A2) was adjusted too far toward the rear of the machine or the latch is of original short style. Inset #4.

24. Latch on cycle stop arm not dropping in time to position in front of rock lever as shown in inset #4. (Excessive clearance between top of rock lever and bottom of latch could cause this. See inset #5.)

The offset (A2) should be adjusted to sideframe stud (A3) so that approximately 1/32" to 1/16" clearance exists between (VV) and (UU) as shown in inset #5. Excessive clearance may prevent (UU) from engaging (VV) following a trip thereby resulting in repeated cycles.

25. Trip lever flexible end (W) may be improperly adjusted and not raising high enough. See insets #4 and #5.

When the dial pin (N) strikes the trip lever (P), the flexible end of trip lever (W) should raise appr. 1/32" above the latch on cycle stop arm. See inset #4.

26. 4786½ friction spring (A5) applying excessive friction against shifter.

    Adjust the 4786½ spring (A5) away from the shifter rod (TT) or remove it entirely from the machine.

27. Clutch yoke out of balance.

    Install 40-781x2 clutch yoke with short minus extension 2925. See inset #16. With this yoke it will be necessary to install a 27-725x1 (G). For details see MSB #404.

28. 40-715 (A4) failing to latch properly or unlatching prematurely.

    Lug (U) may not be adjusted properly to move the 4716x1 for a definite latching when the division lever is thrown. Check adjustment between (EE) and division lever stud. Also check spring tension on latch (A4) and 4716x1. See insets #15 and #16.

29. Carriage locks (XX) failing to move upward their full distance during shift because of interference with 41-210. See inset #3.

    Free the carriage lock cams (WW) if binding. Adjust brake tension on the cams. Slightly lower the carriage shifter.

30. Roller (X) rubbing on or catching in front of stud 2768 (A1). Inset #7A.

    Bend stud (A1) downward.

31. 40-731 (S) pulling roller (X) slightly toward front of machine following a minus bumper stroke.

    See that stock (MM) has been carefully removed as shown in MSB #257. Also note whether (S) has been excessively peened where it contacts its stop stud in the side frame. Clearances (C) and (H) should be maintained between (S) and (F) as shown in inset #20.